HYDROLOGY

Project title: Rocky Mountain Snowpack Chemistry Monitoring

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Objective: 1) Long-term monitoring of annual snowpack chemistry on and off snowpacked roadways where snowmobiles travel. 2) Compare levels of acidic precursors, especially ammonium and sulfate, in snowpacked roadways subjected to low and high levels of snowmobile traffic during winter, to background levels in off-road snowpacks.

Findings: The elevated concentrations of ammonium and sulfate detected in recent years at sites near Old Faithful, especially, were seen again in the 2001 snowpack. The pattern of higher concentrations in snow in snowpacked roadways relative to concentrations measured off roadways used by snowmobiles by distances ranging from about 50 to 10,000 meters was observed again in the 2001 study. We will continue the monitoring at the same sites as in recent years during 2002 (West Yellowstone, Old Faithful, and Sylvan Lake).

Project title: Disturbance Impacts on Stream Morphology, Microhabitats, and Riparian Ecology

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Objective: The goal of this project is to determine the distribution and persistence of impacts from mining operations and fire on stream morphology, in-stream habitats, and riparian ecology.

Findings: Mine impacts persist for decades to centuries after mine closure in mountain streams like those of Northeastern Yellowstone National Park. In Soda Butte Creek, tailings dam failures emplaced tailings well above the reach of modern day floods. Modern floods therefore cannot cleanse the riparian environment of these toxic metals, which continue to impair vegetation. The alpine and subalpine environments where mining occurred do not recover over decadal time scales

under natural conditions, so high runoff continues to introduce metals to the active stream, where they impair benthic communities.